The Beagle, Records of the Museums and Art Galleries of the Northern Territory, 2003 **19**: 97–99

Short communication

Occurrence of the polychaete *Namalycastis hawaiiensis* Johnson, 1903 (Nereididae: Namanereidinae) in *Pandanus* leaf axils on Palau, West Pacific

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Namalycastis hawaiiensis Johnson, 1903 is a widespread, tropical Indo-Pacific namanereid polychaete occurring from the Hawaiian Islands in the east to Sumatra in the west, and Amami-Oshima, Ryukyu Islands in the north to Milne Bay, Papua New Guinea in the south. The species is known from Palau on the basis of a single record from Arakataoch Stream, a freshwater river about 1.5 km south-east of Ngarekeai village (Glasby 1999), but details of the habitat there are unknown. Typically, *N. hawaiiensis* is associated with various coastal riparian habitats including streams, swamps, aquaculture ponds (for *Macrobrachium* species) and, in the Hawaiian Islands, slightly saline anchialine pools and aquaculture ponds.

This note records the occurrence of *N. hawaiiensis* in a new habitat – phytotelmata, or plant container habitats – better known as refuges for insects. Phytotelmata, derived from the Greek words for plant, *phyton*, and for standing water or pool, *telma*, are small water bodies that accumulate in the depressions and crevices of plants, including tree holes and leaf axils (see Kitching 2000). Often phytotelmata contain small amounts of detritus in addition to the water. The only previously published record of a polychaete species associated with phytotelmata is the tropical Indo-Pacific namanereid *Namanereis catarractarum* Feuerborn, 1931 (Glasby *et al.* 1990; Glasby 1999: 128). Freshwater is a very unusual habitat for polychaetes in general especially when, as in phytotelmata, there is no direct connection to the sea.

Namalycastis hawaiiensis Johnson, 1903

(Figs 1–3)

Material examined. One specimen (NTM W18656), complete, 2.0 mm wide (including parapodia), about 20 mm in length, with 120 chaetigerous segments.

Remarks. The specimen resembles closely the description of the neotype of *Namalycastis hawaiiensis* and other material from Hawaii (Glasby 1999: 49). The only difference is the size and form of the two pairs of eyes, which in the Palau specimen are slightly larger, with the anterior eyes of each pair coalesced with the posterior ones (Fig. 1). This difference may be an artefact because the appearance of the eyes can be affected to some degree by preservation; for example, the eyes may coalesce because of distortion of the prostomium either during fixation or preservation. Importantly, no lenses were observed in this specimen, which distinguishes it from the lens-eyed *N. indica* (Southern, 1921), its freshwater congener in coastal regions of the Indian subcontinent. The two species can further be distinguished from each other in the form and relative number of falcigerous chaetae in the parapodia. *Namalycastis indica* has been reported from similar habitats in coastal areas of India (Bay of Bengal) and Thailand (Andaman Sea) (Glasby 1999: 55), but not as yet from phytotelmata.

Habitat and biology. The specimen was collected in coastal lowlands vegetated with grasses and *Pandanus* (species not identified) about 1 km from the shore and about 13 km from Ngarekeai village (Fig. 2). The worm was found in the water-filled leaf axils of a *Pandanus*, together with mosquitoes (Fig. 3). The mosquitoes were identified as *Ochlerotatus* (subgenus *Finlaya*) sp. and *Culex* (subgenus *Lophoceraomyia*) sp. At the time of collection the trunks of the *Pandanus* were dry, which presumably created a barrier for the dispersal of the worm to the ground.

Observations made on specimen in a shallow, water-filled plastic container indicate that it will expose part of its body to air although it never completely left the container. The worm may be confined to the phytotelmata during dry periods, but could possibly move around the plant more freely – including down

Fig. 1. Preserved specimen of *Namalycastis hawaiiensis*, anterior end, dorsal view. Photo: C. Glasby.

Fig. 2. Habitat of *Namalycastis hawaiiensis* on coastal lowlands near Ngarekeai village, Palau. Photo: M. Mogi.

the trunk – during wet periods. It did not appear to catch live mosquito larvae, but it did show interest in dead mosquito larvae – by stopping and touching them a few times – although it did not consume them.

DISCUSSION

Feuerborn (1931) found that southern Sumatran populations of *N. hawaiiensis* (which he referred to by its junior synonym, *Lycastis ranauensis* Feuerborn, 1931) are hermaphrodites, with both eggs and immature sperm found in the same individual. Eggs, 125-135 µm in diameter, are thought to be fertilised outside the body and deposited in a jelly mass. After four days, the larvae hatch into 3-chaetiger juveniles, and leave the jelly mass. The jelly mass probably affords some protection against desiccation and/or osmotic stress that would normally affect an embryo lacking nephridia. Feuerborn (1931) described a similar reproductive strategy for the other phytotelmatic namanereid, *Namanereis catarractarum*. This suggests that this particular reproductive strategy permits life in phytotelmata, as well as the other freshwater environments inhabited by these species.

Although *N. hawaiiensis* normally lives in fresh or slightly saline waters, it can tolerate full-strength seawater if the salinity is increased gradually – over a period of eight days according to Feuerborn (1931). However, it is not known how long the worms can survive in full strength seawater because although all of his experimental worms died after four weeks in seawater; they may have died of starvation rather than osmotic stress. Therefore, the species may have the ability to disperse away from freshwater container habitats, especially during the wet season, and potentially reach the coast. How they have ended up with such a wide Indo-Pacific distribution is, however, quite a mystery. A vicariant explanation has been suggested – uplifting of continental margins and/or sea level change could explain simultaneous speciation of a marine ancestor in tectonically active areas, and could be a general mechanism for speciation in the subfamily (Glasby 1999: 142). But human-assisted translocation of populations (e.g. via the freshwater aquarium trade, aquaculture activities, and/or the trade or exchange of particular plant specimens) is also a possibility because of this species' preference for riparian detritus and plant-associated habitats. The record of *N. hawaiiensis* in freshwater ponds at the Botanical Gardens, Bogor, Java, Indonesia (Horst 1909), may be an example of such an introduction. Hermaphroditism (especially self-fertilisation) would clearly increase the probability of colonization success by anthropogenic means.

ACKNOWLEDGMENTS

We thank Dr Masanori Sato for bringing this record to the attention of C.J.G. and for kindly facilitating contact between the authors. Dr Paul Schroeder kindly translated Feuerborn's paper, and suggested improvements to the manuscript.

Fig. 3. Close-up of the *Pandanus* leaf axils from where the specimen was collected. Photo: M. Mogi.

REFERENCES

Feuerborn, H. J. 1931. Eine Rhizocephale und zwei Polychaeten aus dem Süßwasser von Java und Sumatra. *Verhandlungen der Internationalen Vereinigung für theoretische und angewandte Limnologie, Stuttgart* **5**: 618-660.

Glasby, C. J. 1999. The Namanereidinae (Polychaeta: Nereididae). Part 1. Taxonomy and phylogeny, Part 2. Cladistic biogeography. *Records of the Australian Museum Supplement* **25**: 1-144.

Glasby, C. J., Kitching, R.L. and Ryan, P.A. 1990. Taxonomy of the arboreal polychaete *Lycastopsis catarractarum* Feuerborn (Namanereidinae: Nereididae) with a discussion of the feeding biology of the species. *Journal of Natural History* **24**(2): 341-350.

Horst, R. 1909. On freshwater nereids from the botanical gardens at Buitenzorg belonging to *Lycastis hawaiiensis* Johnson. *Bulletin du Departement de l'Agriculture aux Indes Néerlandaises* **25**: 1-5.

Johnson, H. P. 1903. *Freshwater nereids from the Pacific coast and Hawaii, with remarks on fresh-water Polychaeta in general*. Pp. 205-222. Mark Anniversary volume. Henry Holt: New York

Kitching, R.L. 2000. *Food webs and container habitats. The natural history and ecology of phytotelmata*. Cambridge University Press: Cambridge.

Southern, R. 1921. Polychaeta of the Chilka Lake and also of fresh and brackish waters in other parts of India. *Memoirs of the Indian Museum Calcutta* **5**: 563-659.

Accepted 14 November 2003